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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte FRANCESCA PIGNAGOLI, PAOLO GOLINI and
EILEEN M. LANCASTER

Appeal 2009-1285
Application 10/539,961
Technology Center 1700

Heard: April 23, 2009:
Decided:[1] May 7, 2009

Before CHUNG K. PAK, TERRY J. OWENS, and
BEVERLY A. FRANKLIN, *Administrative Patent Judges*.

FRANKLIN, *Administrative Patent Judge*.

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[1] The two-month time period for filing an appeal or commencing a civil action, as recited in 37 C.F.R. § 1.304, begins to run from the Decided Date shown on this page of the decision. The time period does not run from the Mail Date (paper delivery) or Notification Date (electronic delivery).

DECISION ON APPEAL

STATEMENT OF THE CASE

Appellants seek our review under 35 U.S.C. § 134 of the final rejection of claims 1, 8-15, 19, 20, and 22-25. We have jurisdiction under 35 U.S.C. § 6(b) (2002).

Claims 1, 13, 14, 19, 22, and 23 are representative of the subject matter on appeal and are set forth below:

1. A polyol composition suitable for the preparation of a rigid polyisocyanates-based foam comprising:

a) blowing agent comprising formic acid, wherein said formic acid comprising 1.5 to 3.5 parts per 100 parts by weight of said polyol composition including said formic acid;

b) an aromatic polyol comprising an aromatic polyoxyalkylene polyol based on an initiator obtained from the condensation of a phenol with an aldehyde, wherein said aromatic polyoxyalkylene polyol comprising at least 20 weight percent based on total weight of the polyol composition; and

c) a physical blowing agent, wherein said physical blowing agent comprising 4 to 10 parts per 100 parts by weight of said polyol composition, and wherein said physical blowing agent being a hydrocarbon selected from the group consisting of butane, pentane, cyclopentane, hexane, cyclohexane, heptane, and isomers thereof.

13. A polyurethane foam obtained by bringing together under foam-forming conditions a polyisocyanates with a polyol composition characterized in that:

a) the polyisocyanates is present in an mount to provide for an isocyanate reaction index of from 80 to 150; and

b) the polyol composition comprises (i) formic acid, wherein said formic acid comprising 1.5 to 3.5 parts per 100 parts by weight of said polyol composition including said formic acid; (ii) an aromatic polyoxyalkylene polyol based on an initiator obtained from the condensation of a phenol with an aldehyde, wherein said aromatic polyoxyalkylene polyol comprising at least 20 weight percent based on total weight of the polyol composition; and (iii) a physical blowing agent, wherein said physical blowing agent comprising 4 to 10 parts per 100 parts by weight of said polyol composition, and wherein said physical blowing agent being a hydrocarbon selected from the group consisting of butane, pentane, cyclopentane, hexane, cyclohexane, heptane, and isomers thereof.

14. A polyisocyanurate foam obtained by bringing together under foam-forming conditions a polyisocyanate with a polyol composition characterized in that:

a) the polyisocyanate is present in an amount to provide for an isocyanate reaction index of from 150 to 600; and

b) the polyol composition comprises (i) formic acid, wherein said formic acid comprising 1.5 to 3.5 parts per 100 parts by weight of said polyol composition including said formic acid; (ii) an aromatic polyoxyalkylene polyol based on an initiator obtained from the condensation of a phenol with an aldehyde, wherein said aromatic polyoxyalkylene polyol comprising at least 20 weight percent based on total weight of the polyol composition; and (iii) a physical blowing agent, wherein said physical blowing agent comprising 4 to 10 parts per 100 parts by weight of said polyol composition, and wherein said physical blowing agent being a

hydrocarbon selected from the group consisting of butane, pentane, cyclopentane, hexane, cyclohexane, heptane, and isomers thereof.

19. A process for preparing a closed-celled polyisocyanurate foam by bringing into contact under foam-forming conditions a polyisocyanate with a polyol composition in the presence of a blowing agent mixture wherein the polyol composition comprises an aromatic polyester polyol and an aromatic polyether polyol and wherein the blowing agent mixture comprises formic acid and a hydrocarbon selected from the group consisting of butane, pentane, cyclopentane, hexane, cyclohexane, and heptane, and the isomers thereof, said formic cid comprising 1.5 to 3,5 parts per 100 parts by weight of said polyol composition including said formic acid, wherein said physical blowing agent comprising 4 to 10 parts per 100 parts by weight of said polyol composition, and characterized in that the polyisocyanates is present in an amount to provide for an isocyanate reaction index of from greater than 150 to about 600.

22. A two component foam forming system comprising:

a) An aromatic polyisocyanate having an average of from 2.8 to 3.2 isocyanate groups per molecule; and

b) A polyol composition that contains: (i) an aromatic polyester polyol and an aromatic polyether polyol based on an initiator obtained from the condensation of a phenol with an aldehyde, wherein said aromatic polyoxyalkylene polyol comprising at least 20 weight percent based on total weight of the polyol composition; and (ii) a blowing agent mixture comprising formic acid and a hydrocarbon selected from the group consisting of butane, pentane, cyclopentane, hexane, cyclohexane, and heptane, and the isomers thereof, wherein said formic acid comprising 1.5 to

3.5 parts per 100 parts by weight of said polyol composition including said formic acid, and wherein said physical blowing agent comprising 4 to 10 parts per 100 parts by weight of said polyol composition.

23) A method of improving fire retardancy of a polyisocyanates-based foam comprising the steps of:

providing a polyol composition comprising;

a) blowing agent comprising formic acid, wherein said formic acid comprising 1.5 to 3.5 parts per 100 parts by weight of said polyol composition including said formic acid;

b) an aromatic polyol comprising an aromatic polyoxyalkylene polyol based on an initiator obtained from the condensation of a phenol with an aldehyde, wherein said aromatic polyoxyalkylene polyol comprising at least 20 weight percent based on total weight of the polyol composition; and

c) a physical blowing agent, wherein said physical blowing agent being a hydrocarbon selected from the group consisting of butane, pentane, cyclopentane, hexane, cyclohexane, heptane, and isomers thereof, and wherein said physical blowing agent comprising 4 to 10 parts per 100 parts by weight of said polyol composition;

providing a polyisocyanate;

bringing together under foam-forming conditions said polyol composition and said polyisocyanate; and

thereby forming a polyisocyanates-based foam having an improved fire retardancy.

The prior art relied upon by the Examiner in rejecting the claims on appeal is:

Hickey	6,359,022 B1	Mar. 19, 2002
Chow	3,842,036	Oct. 15, 1974

SUMMARY OF THE DECISION

We affirm.

THE REJECTIONS

On page 2 of the Answer, the Examiner states that Appellants' statement of the grounds of rejection is "substantially correct". The Examiner indicates that all claims 1, 8-15, 19, 20, and 22-25 are rejected in a single grounds of rejection, as follows:

1. Claims 1, 8-15, 19, 20, and 22-25 stand rejected under 35 U.S.C. 103(a) as being obvious over Hickey in view of Chow.

ISSUE

Have Appellants shown that the Examiner reversibly erred in concluding that the claimed aspect of:

> a blowing agent comprising formic acid, wherein said formic acid comprising 1.5 to 3.5 parts per 100 parts by weight of said polyol composition including said formic acid;
>
> an aromatic polyol comprising an aromatic polyoxyalkylene polyol based on an initiator obtained from the condensation of a phenol with an aldehyde, wherein said aromatic polyoxyalkylene polyol comprising at least 20 weight percent based on total weight of the polyol composition; and
>
> a physical blowing agent, wherein said physical blowing agent comprising 4 to 10 parts per 100 parts by weight of said polyol composition,

and wherein said physical blowing agent being a hydrocarbon selected from the group consisting of butane, pentane, cyclopentane, hexane, cyclohexane, heptane, and isomers thereof

does not patentably distinguish Appellants' claimed subject matter from that taught by the applied art?

FINDINGS OF FACT

Hickey teaches that formic acid can be used as a blowing agent in conjunction with other blowing agents. See Col. 13, ll. 41-48 of Hickey. Hickey teaches that combinations of any of the auxiliary chemically active blowing agents may be employed and preferred chemically active blowing agents combinations include mixtures of some or all of formic acid, formic acid salts, and water. Col. 14, ll. 66-67 through col. 15, ll.1-3 of Hickey.

With regard to the claimed amount of formic acid, the Examiner finds, on page 4 of the Answer, that Hickey teaches that the total and relative amounts of blowing agents will depend upon the desired foam density, the type of hydrocarbon, and the amount and type of additional blowing agents employed.

With respect to the polyol component, the Examiner finds, on pages 3-5 of the Answer, that Hickey discloses polyols including aromatic polyester polyol and polyether polyols as part of a two component foam forming composition. Col. 1, ll. 12-30, col. 2, ll. 41-51, col. 3, ll. 22-24, col. 4, ll. 66-67. col. 11, ll. 65-67, col. 12, ll. 55 et seq. of Hickey. The Examiner finds that Hickey teaches an amount of polyether polyols of up to 80 percent by weight based upon the total weight of the polyol component. Col. 12, ll. 63-64 of Hickey. Chow teaches phenol formaldehyde novolak initiated

polyalkylene oxide polyols useful polyether polyols in the formation of rigid polyurethane and polyisocyanurate foams for purposes of assisting in rigidity contribution and enhancing strength and stability properties in products formed. Col. 1 line 46- col. 3 line 22, e.g., of Chow.

With respect to component c, the Examiner finds that Hickey teaches the use of hydrocarbon blowing agents, in the resin blend, from about 1 to about 35 percent by weight, more preferably from about 5 to about 30 percent by weight, most preferably, from about 10 to about 20 percent by weight, based on the total weight of the resin blend. Column 16, lines 29-37 of Hickey.

PRINCIPLES OF LAW

"Often, it will be necessary for a court to look to interrelated teachings of multiple patents; the effects of demands known to the design community or present in the marketplace; and the background knowledge possessed by a person having ordinary skill in the art, all in order to determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue." *KSR International Co., v. Teleflex Inc.*, 550 U.S. 398, 418 (2007). "To facilitate review, this analysis should be made explicit." Id. "[T]he analysis need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ." *Id.*

"[W]hen a patent 'simply arranges old elements with each performing the same function it had been known to perform' and yields no more than one would expect from such an arrangement, the combination is obvious."

KSR Int'l Co. v. Teleflex Inc., 550 U.S. at 418 (*quoting Sakraida v. Ag Pro, Inc.*, 425 U.S. 273, 282 (1976)).

One cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. *Keller*, 642 F.2d at 425-426; *In re Merck & Co., Inc.*, 800 F.2d 1091, 1097-1098 (Fed. Cir. 1986).

In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art", a prima facie case of obviousness exists. *In re Wertheim*, 541 F.2d 257, (CCPA 1976); *In re Woodruff*, 919 F.2d 1575, (Fed.Cir. 1990) (The prior art taught carbon monoxide concentrations of "about 1-5%" while the claim was limited to "more than 5%." The court held that "about 1-5%" allowed for concentrations slightly above 5% thus the ranges overlapped.); *In re Geisler*, 116 F.3d 1465, 1469-71 (Fed. Cir. 1997).

A particular parameter must first be recognized as a result-effective variable, i.e., a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation. *In re Boesch*, 617 F.2d 272, 276 (CCPA 1980)("[D]iscovery of an optimum value of a result effective variable…is ordinarily within the skill of the art."); *see also In re Peterson*, 315 F.3d 1325, 1330 (Fed. Cir. 2003) ("The normal desire of scientists or artisans to improve upon what is already generally known provides the motivation to determine where in a disclosed set of percentage ranges is the optimum combination of percentages.").

If a prima facie case of obviousness is established, the burden shifts to the applicant to come forward with arguments and/or evidence to rebut the

prima facie case. *See, e.g., In re Dillon*, 919 F.2d 688, 692 (Fed. Cir. 1990). Rebuttal evidence and arguments can be presented in the specification, *In re Soni*, 54 F.3d 746, 750 (Fed. Cir. 1995), by counsel, *In re Chu*, 66 F.3d 292, 299 (Fed. Cir. 1995), or by way of an affidavit or declaration under 37 CFR 1.132, e.g., *Soni*, 54 F.3d at 750; *In re Piasecki*, 745 F.2d 1468, 1474 (Fed. Cir. 1984). However, arguments of counsel cannot take the place of factually supported objective evidence. *See, e.g., In re Huang*, 100 F.3d 135, 139-40, (Fed. Cir. 1996); *In re De Blauwe*, 736 F.2d 699, 705 (Fed. Cir. 1984).

When considering whether proffered evidence demonstrates patentability, a side-by-side comparison of the claimed invention with the closest prior art which is commensurate in scope with the claims is needed, with an explanation as to why the results would have been unexpected by one of ordinary skill in the art. *See In re Baxter Travenol Labs.*, 952 F.2d 388, 392 (Fed. Cir. 1991); *In re De Blauwe*, 736 F.2d 699, 705; *In re Grasselli*, 713 F.2d 731, 743 (Fed. Cir. 1983); *In re Clemens*, 622 F.2d 1029, 1035 (CCPA 1980); *In re Freeman*, 474 F.2d 1318, 1324 (CCPA 1973); *In re Klosak*, 455 F.2d 1077, 1080 (CCPA 1972).

ANALYSIS

Appellants argue that their claimed invention requires the combination of all three recited components a), b), and c), in the specifically claimed amounts, which facilitates the unexpectedly improved properties, such as fire and smoke retardation. Appellants argue the applied art does not teach this claimed combination. Br. 10. Appellants also present a showing of

these unexpectedly superior results via the Rule 132 Declaration of Paolo Golini. Br. 13-17. Reply Br. 8-12.

Beginning with component a, Appellants assert that while Hickey discloses that organic carboxylic acids may be used as auxiliary chemically active blowing agents, and a most preferred carboxylic acid is formic acid (col. 14, ll. 5-7 and 44-45), Hickey fails to require formic acid. Br. 11.

Appellants also state that Hickey fails to mention anything about the claimed amount, i.e. formic acid comprises 1.5 to 3.5 parts per 100 parts by weight of the polyol composition including formic acid. Br. 11.

We are not convinced by Appellants argument. Hickey teaches that formic acid can be used as a blowing agent in conjunction with other blowing agents. See Col. 13, ll. 41-48 of Hickey. Hickey teaches that combinations of any of the auxiliary chemically active blowing agents may be employed and preferred chemically active blowing agents combinations includes mixtures of some or all of formic acid, formic acid salts, and water. Col. 14, ll. 66-67 through col. 15, ll.1-3 of Hickey.

With regard to the claimed amount of formic acid, as pointed out by the Examiner on page 4 of the Answer, Hickey teaches that the total and relative amounts of blowing agents will depend upon the desired foam density, the type of hydrocarbon, and the amount and type of additional blowing agents employed. Col. 15, l. 61 through col. 16, l. 37 of Hickey. Thus, as pointed out by the Examiner on page 4 of the Answer, the selected amount "is within the purview of the ordinary practitioner in the art". In other words, the relationship between the amount of blowing agent and characteristics such as foam density is recognized by Hickey as a result

effective variable. As such, the determination of the optimum or workable ranges of such a variable may be characterized as routine experimentation, absent a showing of unexpected results. *Peterson*, 315 F.3d at 1330; *Boesch*, 617 F.2d at 276.

With respect to component b, Appellants assert that Hickey fails to require at least 20 percent by weight percent of an aromatic polyoxyalkylene polyol based on an initiator obtained from the condensation of a phenol with an aldehyde, based on total weight of the polyol composition.

We are not convinced by this assertion. As the Examiner correctly points out on pages 3-5 of the Answer, Hickey discloses polyols including aromatic polyester polyol and polyether polyols as part of a two component foam forming composition.

The Examiner explains on page 5 of the Answer that Hickey differs from Appellants' claims in that the phenol formaldehyde novolak initiated polyalkylene oxide polyols are not exemplified as species in the description of the preferentially employed polyoxyalkylene polyether additional polyols of Hickey's invention. Col. 11, ll. 65-67 of Hickey.

The Examiner relies upon Chow for teaching phenol formaldehyde novolak initiated polyalkylene oxide polyols to be useful polyether polyols in the formation of rigid polyurethane and polyisocyanurate foams for purposes of assisting in rigidity contribution and enhancing strength and stability properties in products formed (see col. 1 line 46- col. 3 line 22, e.g.). Ans. 5-6. Appellants do not dispute this teaching of Chow.

On page 7 of the Answer, the Examiner reiterates that Hickey teaches an amount of component b that overlaps the amount claimed by Appellants

(Hickey teaches an amount of polyether polyols up to 80 percent by weight based upon the total weight of the polyol component). Col. 12, ll. 63-64 of Hickey.

In view of the above, we agree with the Examiner that the applied prior art references as a whole would have rendered obvious component b, and the amount thereof, as set forth in Appellants' claims. *KSR*, 550 U.S. at 418; *In re Wertheim*, 541 F.2d at 257; *In re Woodruff*, 919 F.2d at 1575; *In re Geisler*, 116 F.3d at 1469-71.

With respect to component c, Appellants argue that Hickey fails to require hydrocarbons as the physical blowing agent, and the required amount thereof (the claimed amount is from 4 to 10 parts per 100 parts by weight of the polyol composition).

We are not convinced by Appellants' argument. The Examiner correctly finds that Hickey teaches the use of hydrocarbon blowing agents, in the resin blend, from about 1 to about 35 percent by weight, more preferably from about 5 to about 30 percent by weight, most preferably, from about 10 to about 20 percent by weight, based on the total weight of the resin blend. Column 16, lines 29-37 of Hickey. Ans. 8. We therefore agree with the Examiner's position regarding component c, including the amount claimed, especially since they can be used together with formic acid. *In re Wertheim*, 541 F.2d at 257; *In re Woodruff*, 919 F.2d at 1575; *In re Geisler*, 116 F.3d at 1469-71.

With specific regard to Chow, Appellants recognize that Chow discloses polyurethane-isocyanurates produced from an alkylene oxide condensate of a Novolak resin, an organic polyisocyanate, and a catalyst that promotes the formation of isocyanurates from isocyanates. Appellants

argue, however, that Chow fails to mention anything about formic acid or the required amounts thereof. Br. 11-13.

We are not convinced by this argument. The Examiner relies upon Chow for resolving the deficiencies of Hickey pertaining to the selection of polyoxyalkylene polyether polyol, as discussed in more detail, supra. As correctly found by the Examiner, Hickey and Chow as a whole would have suggested employing formic acid. One cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. *Keller*, 642 F.2d at 425-426; *In re Merck & Co., Inc.*, 800 F.2d at 1097-1098.

With regard to Appellants' Rule 132 Declaration of Paolo Golini, we are in agreement with the Examiner's position that the evidence is not commensurate in scope with the claims, for the reasons provided by the Examiner. Ans. 10-12. *In re Baxter Travenol Labs.*, 952 F.2d at 392 (Fed. Cir. 1991); *In re De Blauwe*, 736 F.2d at 705; *In re Grasselli*, 713 F.2d at 743 (Fed. Cir. 1983); *In re Clemens*, 622 F.2d at 1035 (CCPA 1980); *In re Freeman*, 474 F.2d at 1324 (CCPA 1973); *In re Klosak*, 455 F.2d at 1080 (CCPA 1972).

Appellants argue that the Examiner is in error regarding his statement that Appellants must provide a "clear and convincing showing" in connection with their declaration evidence (i.e., level of proof of unexpected results). Br. 15. Regardless of the burden (i.e., "clear and convincing evidence" standard or "preponderance of evidence" standard) involved in showing unexpected results, Appellants' showing of unexpected results fails under even the lowest burden standard implied in *In re Soni*, 54 F.3d 746,

750 (Fed. Cir. 1995). Compare *In re Heyna*, 360 F.2d 222, 228 (CCPA 1966) .

In view of the above, we affirm the rejection of claims 1, 8-15, 19, 20, and 22-25 under 35 U.S.C. 103(a) as being obvious over Hickey in view of Chow.

CONCLUSIONS OF LAW

Appellants have not shown that the Examiner reversibly erred in concluding that the claimed aspect of:

> " a) blowing agent comprising formic acid, wherein said formic acid comprising 1.5 to 3.5 parts per 100 parts by weight of said polyol composition including said formic acid;
>
> b) an aromatic polyol comprising an aromatic polyoxyalkylene polyol based on an initiator obtained from the condensation of a phenol with an aldehyde, wherein said aromatic polyoxyalkylene polyol comprising at least 20 weight percent based on total weight of the polyol composition; and
>
> c) a physical blowing agent, wherein said physical blowing agent comprising 4 to 10 parts per 100 parts by weight of said polyol composition, and wherein said physical blowing agent being a hydrocarbon selected from the group consisting of butane, pentane, cyclopentane, hexane, cyclohexane , heptane, and isomers thereof"

does not patentably distinguish Appellants' claimed subject matter from that taught by the applied art.

DECISION

Each of the rejections is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED

tc

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